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## LECTURES.

### ON THE PHYSIOLOGY OF THE SPINAL CORD.

DELIVERED AT THE COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK,  
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#### IV.

REFLEX ACTION OF THE SPINAL CORD IN WARM-BLOODED ANIMALS AND  
IN MAN. DIMINUTION OR INCREASE OF REFLEX ACTION. PHYSIO-  
LOGICAL FUNCTIONS OF THE SPINAL CORD AS A NERVOUS CENTRE.

GENTLEMEN, — Having investigated, as far as our time permits, the reflex action of the cord in its simpler manifestations in the cold-blooded animals, let us now endeavor to see whether anything of a similar nature can be observed in the higher animals and in man. It has been ascertained beyond a doubt that in all species the reflex action of the spinal cord is constantly in operation, but as a general rule, and especially in man, this action escapes notice, for the reason that its phenomena are overshadowed by those of conscious sensation and of the will. The reflex action of the cord is dwarfed, as it were, by the manifestations of consciousness and volition. Before completing the consideration of this subject, however, I think we shall see abundant proof of its importance.

In man, the reflex action of the cord has been noticed for many years in certain diseased conditions, and especially in cases of paraplegia. When, as a result of destructive lesions in the cord, communication is cut off between the brain above and the lower part of the body, there is sometimes an opportunity for the study of these phenomena. Some sudden accident may sever the physical continuity of the cord, or an inflammation may cause compression or disintegration of its substance. In such cases it has been noticed, over and over again, that although the patient be quite unable to move the lower extremities of his own volition, and although he may have lost the sense of feeling in these parts, yet the limbs may be caused to move by the application of an external stimulus. It is by no means necessary, for this purpose, to employ

a violent irritation; on the contrary, a slight one seems to act most efficiently in producing the effect. Some years ago I had an opportunity of studying this reaction very fully in a patient who had been affected with spinal meningitis, resulting in complete paraplegia. The functions of the brain were not in the least affected, and the intelligence and volition were entirely normal. Yet, although there was no sensibility whatever remaining in the lower limbs, on throwing back the bed-clothing and simply exposing them to the sudden contact of cool air, an involuntary twitching of the toes was often noticeable. Drawing the point of a fine needle gently over the soles of the feet would also produce convulsive movements of the toes, and even well-marked flexion of the knees and ankles. All this time the patient was entirely unconscious of either sensation or movement. During the continuance of the paralysis, which was of considerable duration, and at last ended fatally, I repeatedly witnessed these phenomena.

The reflex action of the cord in the human subject, as I have said, was first recognized in diseased states of the system, and it was then regarded as a rare and exceptional occurrence, noticeable only in man under morbid conditions, or in the lower animals after experimental operations. It was hardly supposed that these actions were constantly in operation in the human system in health as well as in disease. It afterward became evident, however, that this is actually the case. A few years ago, Robin obtained some interesting results in a decapitated criminal who had been executed by the guillotine about an hour before. The neck had been severed at the level of the fourth cervical vertebra. The body was lying, at the time of the experiments, in a natural position upon its back, with the arms extended along the sides, the right hand being at a distance of about twenty-five centimetres laterally from the body. On gently scratching with the point of a scalpel the skin over the right nipple, there was a rapid and successive contraction of the pectoralis major, the biceps, the brachialis anticus, and the muscles about the internal condyle of that side, producing a movement of flexion and inward rotation of the arm, until the hand was at last applied to the lower part of the chest. This experiment was repeated with a similar result no less than four times, but each time the action was less vigorous, and at length there was only a slight contraction of the pectoralis major, not sufficient to move the limb. It is very seldom that we have the opportunity of seeing such manifestations after death in warm-blooded animals, since the reflex actions of the cord, like all other nervous phenomena, are less persistent in them than in the cold-blooded animals. Besides, the muscular movements depending on spinal reflex action are very simple and easily recognized in the cold-blooded animals, but comparatively complex in the warm-blooded animals and in man.

But even when there is no injury or disease whatever, either of the cord or other parts, by observing closely the movements of the body in your own person you may often perceive, from time to time, certain involuntary actions performed by the muscles which are usually under the control of the will. These actions are directed by the spinal cord. The spinal cord is sometimes a more vigilant sentinel than the brain for the protection of the body from injury; or at least it reacts more promptly on the approach of danger. Almost all the sudden accidents which are liable to inflict physical injury are provided against to a greater or less degree by the reflex action of the spinal cord. In any unexpected fall, for even a short distance, as, for instance, through a hatchway from one floor of a building to another, all the limbs become instantly flexed, so as to protect the body and its internal organs as much as possible from contusion or laceration. All the parts are put in the best possible position to sustain a shock or injury without the least intentional effort on the part of the individual, and, indeed, without his consciousness. Hence it is that such accidents so rarely result in a serious injury. Nevertheless, as we shall presently see, there are still more important and extensive offices performed through the independent agency of the spinal cord.

The reflex action of the cord has certain objects to accomplish which are quite as definite as if they were designed by the intelligence. You have not forgotten the experiment performed yesterday upon the decapitated frog. But in order to bring the matter before you in another light, I will now repeat the experiment by pinching the hind foot of this frog, whose head has also been removed for some time. You see a movement of the limb takes place, by reflex action, as before. You probably remember, also, an experiment performed a fortnight ago to illustrate the general subject of nervous irritability. This experiment consisted in placing the two poles of a galvanic battery in contact with different points of the sciatic nerve of a separated frog's leg. I will also repeat this experiment upon this frog's leg, prepared as before, with the sciatic nerve attached. The battery is now arranged so that the nerve will form a part of the circuit. As I make the connection the limb, you see, is violently extended. The reason of this extension is that the whole sciatic nerve is stimulated at once by the galvanic discharge; and, as the extensor muscles preponderate in force over the flexors, the limb, as a whole, undergoes extension. In other words, a motor stimulus traversing the entire sciatic nerve produces a movement of extension in the limb. But how is it in this decapitated frog when I pinch the skin of the foot? Here we have not an extension of the limb, but a flexion. The foot is drawn upward, as if to escape the source of irritation. In this case it is the flexor muscles which contract, and not the extensors. This difference in muscular action is due to the fact

that we are now acting not directly upon the sciatic nerve, but upon the spinal cord as a nervous centre. An irritation applied in this way always produces contraction of the flexor muscles. It is as though the animal withdrew the limb on account of the pain produced by pinching its foot, and yet it has neither consciousness to feel the pain nor volition to execute a movement.

I have here some water in a glass goblet to which I will add a drop or two of acetic acid, just enough to give the fluid an acid reaction. Now, suspending the decapitated frog by the upper part of its trunk, I immerse one of the feet in the acidulated water. You see the violent movements at once excited. The limb is not only drawn up, but it acts as though it were endeavoring to brush off the irritating liquid, which in this way is scattered over other parts of the body, and there also produces active manifestations. Sometimes we obtain even more striking results than these. If I apply a drop of stronger acid to the side of the animal, you observe, not only the hind foot, but the fore foot also is applied to the spot irritated; and it is a very significant fact that the movements which are set up in this way are almost exclusively confined to that side of the body to which the acid liquid was applied, namely, in this case, the left. You will notice that there are, indeed, a few movements of the right leg, but they are very much less marked than those on the left side. If we now repeat the same experiment upon the right side you see that a similar result is obtained, the action of the limbs on the two sides being reversed. This almost looks as if it were the result of design, and as if the spinal cord were able to distinguish between the right and left sides of the body.

It is on account of these curious phenomena that one or two writers of considerable eminence have broached the idea of a real consciousness and volition existing in the spinal cord. I must say that such an opinion seems to me singularly unfounded, and due to a most injudicious interpretation of the facts. It is incompatible with other phenomena which are equally striking, and it is really unnecessary for the explanation of any. In the cold-blooded animals all movements of the limbs are of a simple character, and hence the reflex actions closely resemble those which are voluntary. If our knowledge were derived only from experiments on the decapitated frog, such as those you have just witnessed, we might be in doubt whether consciousness and volition were really abolished by removing the brain, for the animal cannot tell us whether he feels or not. He has no means of expressing his sensations, if any such exist, except by motion of the limbs. But, fortunately, we are not obliged to depend on these facts alone in forming our judgment. A *man* can tell us distinctly whether he has sensation or not; and in cases of paraplegia, in the human subject, we know that reflex movements take place in the lower limbs alto-



gether independently of both consciousness and volition. This alone is conclusive proof of the erroneousness of the doctrine above mentioned. When the paralysis of the lower limbs is complete, the patient has no more consciousness of anything that is done to them than if they were made of wood, and yet reflex movements are readily excited by the application of a local stimulus.

It only remains to consider the adaptation of reflex movements to a particular end. The apparent difficulty in explaining this adaptation has done much to favor a hasty theorization on the subject. There is no real difficulty, however, in the matter. Why should not the spinal cord have a definite object to accomplish? When we see such actions going on in the animal economy as the peristaltic motion of the intestines, the pulsations of the heart, and the contractions of the uterus in parturition, all performed for the accomplishment of definite and useful objects, and yet absolutely independent of volition, I am at a loss to perceive why the spinal cord should not also be capable of involuntary action for special objects. It would certainly be an exception to the general rule in the nervous system if it had not; and there is no reason why it should not have a definite purpose to perform, as much without the aid of volition and consciousness as if it were guided by these faculties.

Let us now glance at the mechanism of reflex action, so far as it can be understood, bearing in mind the general characteristics of the spinal cord and its nerves. We know that every motor nerve fibre goes to some definite and special destination in the muscles. Every sensitive nerve fibre has also a definite and particular origin in the integument. Again, both kinds of fibres have also special relations with the gray matter of the cord and its nerve cells. Every sensitive impression must therefore act upon certain special cells in the gray matter, and will be reflected in a special direction through the motor fibres to particular muscles. I am aware that mechanical illustrations can present only a very imperfect analogy to the functions of the nervous system; but at the same time, if due allowance be made, they may sometimes aid us to comprehend its mode of operation. Now suppose we compare the reflex action of the spinal cord to the striking of a clock. The clock-work is arranged in such a way that when the hour-hand has reached a particular spot on the dial-plate it sets in motion an apparatus which strikes that particular hour and no other. If it be two o'clock it strikes two, and not one or three; and this necessarily results from the mechanical connection of its parts. In this way we can explain the phenomena in the case observed by Robin. The action of bringing the hand to the chest was a real defensive movement, such as might have been expected under the influence of volition if the man had been alive. It is true we cannot yet trace all the anatomical connections of sensitive and motor fibres in the spinal

cord, and we are still ignorant of many important details in regard to the mechanism of reflex action. Still, there is no difficulty in understanding that a movement may be perfectly definite and adapted for a special purpose, although performed independently of consciousness and volition.

We next come to the subject of increased or diminished intensity of reflex action in the spinal cord. Anything which depresses the nervous system generally, such as excessive heat or cold, or the shock of a sudden injury, will affect the nervous irritability of the cord. After a frog has been decapitated, there is a temporary period of depression, which passes off after a few moments. On the other hand, some injuries, either of the cord itself or of the peripheral nerves, have the power of increasing this irritability, and certain poisons possess this property to an extraordinary degree. One of the most remarkable of these poisons is strychnine, which causes a notable exaggeration of the spinal reflex movements. Here is a decapitated frog which has not yet been experimented on, and you observe that the hind legs respond in the ordinary way to an irritation applied to the feet. The heart is still acting and the circulation still going on, and consequently a toxic effect may be produced by the hypodermic injection of strychnine. I have here a solution of the extract of *nux vomica*, and after injecting a small quantity beneath the skin of the back I replace the animal under the bell-glass, and allow him to remain quiet for the present. Of course, if the circulation had ceased no effect would be manifested, or rather the poison would be absorbed too slowly, and would take too long a time to reach the spinal cord. But in this case, as the blood is still in motion the poison will be rapidly absorbed, and before long will reach the spinal cord as well as the other organs. The cord, however, is the only part which is sensitive to the action of this substance. It will gradually receive successive portions of the extract, until it has taken up all that it will bear. We will leave the frog where it is for the present, and wait until the poison has time to exert its specific effect.

Our last topic is that of spinal reflex actions in the healthy human subject. These actions in the limbs and trunk are mainly of a protective character. If a gentle irritation be applied to the foot, the spinal cord only takes the trouble, so to speak, to withdraw the part out of reach; but if a stronger irritation be employed both legs may be flexed at once. If a very powerful stimulus be used, instead of flexion, strong extension may be produced, either for the purpose of driving the offensive object away, or else of escaping from it with a bound. I have no doubt that in the frog, in a state of freedom, an ordinary leap is often produced simply by the reflex action of the spinal cord, independently of the exercise of volition.

Besides this, the reflex action of the cord has much to do with main-

taining the normal attitude of the body and limbs. This is a comparatively simple matter in the frog, but in the higher animals and in man it is more complex. Especially is this true in the act of locomotion, on account of the nice balancing required in various parts of the body to maintain the erect posture. For this purpose a consentaneous action of many muscles is necessary. These associated movements are under the control of the spinal cord. Although the act of standing or of locomotion is at first voluntary, it is afterward continued by an involuntary nervous combination. Thus a man begins his walk by an act of volition, but once started he keeps on walking without any further mental effort. In the disease known as locomotor ataxia there is a loss or impairment of this coördinating power, due to a sclerosis of the posterior columns of the cord. It is not a paralysis, properly speaking, since the power of voluntary motion remains unimpaired. When the patient looks at his foot, and moves it by a distinct effort of volition, he can put it down wherever he desires; or he can direct his hand in the same way and pick up any object on the floor. But when he attempts to perform these movements without the aid of sight, and by instinctive muscular combination, he fails, because the spinal cord has lost its coördinative power. When the structural degeneration of the posterior columns is very extensive, the patient can neither stand nor walk; although when lying on his back, with his eyes open, he can move his limbs freely in every direction.

By this time, perhaps, we can see what effect has been produced by the strychnine upon our decapitated frog. You observe that he is still resting in a natural position upon the glass plate; but when I simply touch the skin of the back with the point of a slender wire, all the limbs are at once thrown into a state of violent extension. As soon as relaxation follows, the abdomen of the animal again comes down into contact with the glass plate, and this again causes a repetition of the extension. This is a striking illustration of the manner in which the nervous system is affected by tetanus. In the first place, the convulsive action is never spontaneous, but is always excited by some particular irritation. If I had not touched the frog or applied any irritation to the tegumentary surface, there would have been no spasmodic action manifested, notwithstanding the fact that the system had been poisoned by strychnine. On the other hand, when tetanic movements have once been excited they are exceedingly apt to continue until the reflex irritability of the spinal cord is completely exhausted, since the movements themselves are the occasion of repeated irritations to the tegumentary surface. The animal system cannot long withstand such a strain upon its powers of endurance, and a fatal termination is soon reached. Though some moments have elapsed since the convulsive action was first set up in this frog, you see that the muscles are still so rigid that I can hold the

animal out by the hind legs in an almost horizontal position. Of course, as the brain has been removed, all these phenomena are due to the reflex action of the spinal cord.

Finally, in addition to the functions of the spinal cord as a means of defense for the body, and the preservation of the normal attitude, either at rest or in motion, it fulfills also another very essential office. It exerts a continuous involuntary control over the sphincter muscles and the organs of evacuation. The regulation of the sphincters and that of the expulsive muscular coats, both of the rectum and the urinary bladder, are among the most important functions of the nervous system. The peristaltic movements of the small intestine and the colon are under the influence of the sympathetic nerves; but when the fæces reach the cavity of the rectum they meet with fibres derived from the cerebro-spinal system. The sphincter ani, like other sphincter muscles, is maintained in a state of nearly continuous contraction, being only relaxed when the time comes for the evacuation of the fæces. This steady contraction of the muscular fibres is not kept up by a voluntary effort. It would be quite impossible to continue such an exertion, not only for twenty-four hours, but for a single hour. If you have ever tried the experiment of holding the arm extended horizontally, or even of keeping the lips tightly closed for fifteen minutes together, you know how exhausting such a voluntary effort becomes when long continued. The sphincter ani fulfills its office without any conscious or voluntary exertion on the part of the individual, because its fibres are stimulated by the reflex action of the spinal cord. The proof of this is that if you cut off the communication between the brain and the pelvis by a section of the cord in the middle of the back, the contraction of the sphincter ani remains unimpaired. But if the lower part of the cord itself be destroyed, the contraction of the sphincter is at once abolished. The same thing is true with regard to the sphincter of the urinary bladder. The spinal cord holds under its control both these outlets of the body as an independent nervous centre, and thus contributes to the preservation of the system, without drawing upon the resources of consciousness or volition.

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#### EXOSTOSIS OF THE AUDITORY MEATUS: DEATH FROM MENINGITIS. WITH REMARKS.

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H. O. G., aged fourteen years, was brought to me on March 5, 1869. His father, a physician, was healthy; his mother died of phthisis; he himself, although not strong, had always enjoyed good health. When three years old an otorrhœa began on the left side, continued for several

years without producing any symptoms, then ceased for some six months, began again, and had continued constant up to the time I saw him. One and a half years before his visit to me polypus in the meatus had been diagnosticated, but no operation was performed, and the only treatment adopted was syringing and astringent applications. At no time had there been marked pain in the ear, headache, vertigo, or other symptoms than those of discomfort from the discharge. At the time of his visit the left ear was filled with a thick muco-purulent discharge; the meatus was about two thirds closed by two exostoses overlapping each other, one growing by a broad base from the anterior osseous wall of the meatus, and the other by a still broader base from the posterior wall; the lower portion of the meatus was closed by the firm contact of these growths, but in the upper portion there was a free triangular space through which the deeper parts could be examined. The drum membrane was totally destroyed, and the tympanic mucous membrane quite granular; the Eustachian tube pervious; the hearing for the watch  $\frac{1}{6}$ . For a more thorough examination ether was administered, and the osseous nature of the growths and their firm attachment settled; at the same time an examination with the probe was made as thoroughly as possible, but no caries could be discovered. Thorough cleansing and the application of astringents to the tympanic mucous membrane for some time caused a diminution of the discharge, but not entire cessation.

The case was seen occasionally during the next few years till January, 1874, when I was able to have it under my direct charge for a time, and the granular surface of the tympanum was cauterized by nitrate of silver till it became quite smooth, and the discharge entirely ceased. The exostoses remained as before, without any increase in size. After three months the discharge again returned, but amounted to scarcely more than a slight weeping, for which occasional syringing and inflation were used.

On December 20, 1876, I saw the patient again on account of a slight increase in the discharge, but found the tympanum quite free from any collection, the Eustachian tube easily permeable, and the discharge still very thin and slight in amount. Examination of the exostoses, however, showed that they had increased very much in size, and the passage above them would admit only a medium-sized Bowman's probe. Careful examination with a fine probe failed to detect any caries within the tympanum, and there had been no symptoms other than the slight increase in the quantity of the discharge. The hearing had diminished for the watch from one inch to contact.

Recognizing the possibility of serious mischief if the exostoses continued to enlarge, the question of operation was considered by the father and myself, but as there were absolutely no symptoms, as the discharge

was clear serum and scarcely more in quantity than the weeping of a very slightly inflamed mucous membrane, and as any operation must be necessarily quite severe, it was decided to wait. I myself also hoped that if the meatus became closed the mucous membrane, protected from external changes of temperature, would entirely cease secreting, and the slight inflammation would subside. The patient was advised to use every caution against allowing any collection of secretions in the ear by syringing and inflation of the tympanum, and on the occurrence of any symptoms, however slight, either in the ear or head, to return for examination. He then went back to college.

Two weeks from this time the discharge from the ear ceased entirely, and he was no longer able to force the air through the meatus from the Eustachian tube. No other symptoms, however, showed themselves for four weeks, when for one day he suffered with a severe headache. From this time, about February 10th, to March 22d, there were no symptoms, and he seemed in perfect health. On March 22d he had a severe headache, slowness of speech, and other symptoms which led the physician who was consulted to advise his immediate return home. This he was unwilling to do till the 24th, when the headache, restlessness, and other symptoms continuing he was brought home on a bed. He was then complaining of constant severe pain in the left temporal region and over the left eye, of occasional pain in the occiput, and of photophobia; pulse 96; at night there was slight delirium, with extreme restlessness.

March 25th. The headache and extreme restlessness continued till afternoon, when he became quite bright, laughing and talking with the family. At night the pain and other symptoms returned as before. Pulse 76.

March 26th, the earliest moment at which I could reach him, on account of the intervening Sunday and the lack of railway communication, I found him in a slight stupor, from which he was easily roused. He complained of nearly constant pain in the left lower temporal region; occasional pain over the left eye and in the occiput; and of great photophobia, worst in the left eye. There was tenderness above the left eye and of the left eyeball, and over the left temple. The pupils were normal; sight unaffected; conjunctiva of left eye a little congested. No œdema or swelling anywhere, and no tenderness about the ear. Meatus without discharge and tightly closed by the exostoses, the small opening in the upper part which existed when I last saw him being obliterated. Pulse 76.

From the fact that the pain was confined to the left side, and from the known history, I had no doubt that the inflammation of the ear had extended to the meninges of the brain, and advised free openings in the meatus and mastoid, to give exit to any retained secretions and to

enable us to douche thoroughly the whole tympanic cavity. Ether being given, the exostoses in the meatus were drilled through with a hand-drill, till an opening three millimetres in diameter was made. Examination with a probe then showed that nearly all parts of the tympanum were denuded of periosteum, and probably carious. The mastoid was then exposed by free incision, and opened by a trephine seven millimetres in diameter to the depth of three eighths of an inch or more without entering the cells. A small hand-drill was then applied in the deepest portion of the opening, directed forwards towards the tympanum, and after perforating in this direction about one fourth of an inch it entered the antrum mastoideum. Probes through the two openings could now meet, and on syringing the meatus a full stream of water passed out through the mastoid, bringing a mass of grumous material. The walls of the mastoid opening were of solid bone, and it was evident that hyperostosis existed.

Douching with warm water through the two openings was ordered every hour through the day, and every two hours through the night, with morphine subcutaneously, if necessary, for pain or restlessness.

March 27th his father writes me: "After recovery from the ether he expressed himself as quite free from pain, was more quiet through the night without chloral or morphine than the nights previous, and had good solid sleep between five and seven o'clock. This morning he appears brighter, has taken milk and gruel, and is more free from pain than yesterday, but on raising the head has slight temporo-frontal pain. His pulse is 70 this morning, and has not been above 76 since the operation."

March 28th. Another letter says: "He passed a comfortable day yesterday; said the contrast with the preceding days in regard to pain was almost inexpressible, still a little pain was lurking around the left eye and temporal region. In the course of the night he complained more of the eye. Slept considerably, but was more wakeful than the preceding night. About three and a half o'clock this morning pain became intense, more especially in the posterior part of the head, — more intense, he remarked, than ever before. We administered one sixth of a grain of morphine subcutaneously, which gave speedy relief; perspiration followed, and he slept nicely two or three hours. This morning he is awake and quiet; has some pain, but nothing intense."

That evening I saw him; he appeared quite bright; there was occasional but not severe pain in the same places as before the operation; pulse 76. The openings in the meatus and mastoid were partially obstructed, and were cleared by a probe till water passed freely. Through the night he slept fairly without morphine, but soon after waking, March 29th, was delirious for a short time. The rest of the history I take from his father's letter: "After you left us he seemed a little



brighter and coherent in speech, and remained so till about twelve o'clock, when he complained of increase of pain in the head; pulse 72. By two P. M. it became violent in the occipital region, so that he was almost frantic, and begged me to insert the morphine. I gave one sixth of a grain without relief; in less than an hour another sixth without apparent relief; pulse 76; temperature 101°. The pain was then also in the frontal region between the eyes. I feared convulsions and gave another sixth, and in the course of half an hour there was abatement of the acute suffering. He slept some; breathing short and quick. Occasional tonic contractions of arms and feet. At eleven P. M. complete paralysis of limbs of right side was noticed; face not affected. Left limbs in constant motion; sphincters relaxed; pulse accelerated, 85, full and tense. Upon rousing him he uttered a monosyllable, which was the last word spoken. The motion of the left limbs was so violent that I administered ether, after which it was lessened; pulse continued to increase in frequency. Jactitation of the limbs ceased about five A. M. At eight A. M. the quick respiration gave place to deep stertor; temperature 104°." At nine and a half A. M. death took place. No autopsy.

From the condition of the tympanum found at the time of operation, — extensively denuded and probably carious bone, — there can scarcely be a doubt that the slight secretions retained from the closure of the meatus by the exostoses had excited an increased inflammation of the tympanum, which affected the bone, finally was communicated to the brain, and proved fatal by basilar meningitis. The exostoses were, then, the indirect cause of death, and their early removal would have saved the complications which proved fatal. The case shows the risk attending the permanent retention of the products of a chronic purulent inflammation of the tympanum, however slight in quantity or thin and watery in character.

The operation for opening the tympanum and mastoid was advised, as in a number of similar irritations of the brain from retained tympanic secretion I had seen this operation produce marked relief to the head symptoms, and the patients escaped what threatened to be meningitis. In fact, in these cases of brain disease from tympanic inflammation, there is, in my experience, almost always a period of marked brain symptoms, — circumscribed headache, photophobia, mild delirium occasionally, or confused intellect, without change in the pulse and temperature, and without the usual symptoms of acute meningitis, which might be called the period of meningeal irritation, and which precedes the true symptoms of inflammation by from one to ten days. During these earlier symptoms the operation for evacuating and douching the tympanum almost always gives relief to the brain symptoms, at least for a time, and I have seen one or two cases in which the patients escaped any further brain disease. Even in the case here given the relief from the operation was very decided for two days.

Exostoses of the meatus may be divided into two varieties: those with a more or less distinct pedicle, and those with a broad base; the former generally small, unimportant, and quite rare, — in my own experience I remember to have seen but one example, — the latter beginning gradually and developing to a large size, capable of most serious mischief if they close the meatus, and quite common. Of this latter variety I have seen seven instances, all in men, within the last two years. The history of the development of both varieties is by no means clear; all that can be said is that from our knowledge of pathological processes in general they are now usually referred to an inflammation of the periosteum. Gout, rheumatism, and syphilis, to which they were formerly referred, certainly do not exist in the majority of cases. The clinical histories of the cases, however, show that if periostitis is the case the inflammation may go on absolutely without symptoms, and in some cases without any serious changes in the ear. Of the seven cases above mentioned two had no recollection of ever having suffered from any kind of inflammation of the ears, and I saw them on account of an accidental impaction of cerumen between the bony masses. In both each ear was similarly obstructed by two exostoses, one from the anterior and one from the posterior wall; the drum-membranes were normal, the hearing perfect. In a third case, both ears were also similarly affected by two very large exostoses; the only history of previous disease was that of an acute inflammation in one ear many years before, of short duration; drum-membranes perfect and hearing normal. The other four cases were in persons suffering at the time from chronic purulent inflammation of the tympanum, with more or less destruction of the drum-membranes and great impairment of the hearing; the exostoses existed only in the inflamed ears, and in each case but one ear was diseased. Of these seven cases, two without other disease than the exostoses have been under observation for years, and there has been absolutely no increase in size in the growths; the only one of the others under observation for a long time was that reported in this paper, and it is interesting to note that in this case the exostoses remained without perceptible enlargement for more than six years, although the tympanum was inflamed for the whole of that time, and that no sufficient explanation could be given for their rapid growth during the last few months, except, perhaps, a very slight increase in the general inflammation of the ear.

In regard to the operation on exostoses of the meatus two questions should be considered, namely, the advisability of any surgical interference, and the method of removal. In the pedunculated variety, as they seldom reach any size, or produce any disturbance in the functions of the ear or any pain, their removal is, as a rule, not important. In the few cases which have been reported, in all of which the pedicle was small, a twist with the forceps or a well-directed blow has been sufficient to break off the mass, the healing has been rapid, and the recovery perfect.

In the exostoses with a broad base there is much more to be considered. From what I have seen I think we can exclude from the advisability of any operation all cases not associated with inflammation of the tympanum, and in which there is no tendency to increase in size. If, however, in these same uncomplicated cases the growths are increasing so that they threaten to close or already close the meatus, an operation is absolutely necessary to restore the hearing, which is practically lost by the mechanical obstruction of the meatus. No cases, so far as I know, have ever been reported to show what the final results of such growths would be if left to themselves, but one would fear either an extension into the cavity of the skull through the thin roof of the tympanum and meatus, or else an extension to the tympanum and such a disturbance of the circulation as to set up an acute purulent inflammation which would prove fatal from retained secretion.

Exostoses in connection with a secreting tympanic inflammation, either catarrhal or purulent, must be regarded as a serious complication, for the case first reported in this paper is a demonstration of the fact that such growths, although quiescent for years, may suddenly increase so as to close the meatus and produce the results of retained pus. In these complicated cases there is not only the risk of the exostoses closing the meatus, and so producing a caries of the bone, but if the growths have attained merely a moderate size they so obstruct the view of the deeper tympanic cavity that it is often impossible to make the applications to the tympanic mucous membrane which are necessary for relieving the otorrhœa. From these two circumstances, the possible closure of the meatus and the constant obstruction to the treatment of the otorrhœa, the removal of the growths is distinctly indicated; it is certainly imperatively demanded whenever they are associated with an otorrhœa and are also known to be rapidly increasing in size.

Although all the later text-books on the ear acknowledge the not infrequent occurrence of exostoses, I have been unable to find more than two accounts of examinations of the growths, and these two cases are unsatisfactory. Troeltsch mentions a dissection by Autenrieth,<sup>1</sup> in which an exostosis from the upper posterior wall of the meatus of a woman, aged forty, was found to consist of a bubble-like projection of bone with thin walls and a cellular cavity not connected with the mastoid cells. That this is not always or even often the condition is sufficiently shown by cases which have been operated on of late years where the mass was found to be solid bone of unusual density. Toynbee<sup>2</sup> gives a drawing of a large exostosis, but from the text and the appearance of the figure it is evident that it was drawn theoretically from what he observed in patients during life, and not from an actual dissection.<sup>3</sup> It would be

<sup>1</sup> Riel's Archiv für Physiologie, 1809, ix., page 349.

<sup>2</sup> Diseases of the Ear, page 107.

<sup>3</sup> Schwartz, in Klebs' Pathologische Anatomie, just published, asserts that these exostoses

interesting to know by sections the exact character of these growths, the condition of the bone of the meatus around them, and whether they extend outwards as well as inwards from the walls of the meatus.

A few cases of operation on broad-based exostoses have been reported, but these few are enough to show that removal is possible. Some few cases have also been described by the older authors which were benefited by local and general medication, but whether anything further was gained than an increase in the calibre of the canal from the diminution of thickening and swelling in the skin covering the growth is very doubtful. From what we know now of the solidity of these growths on the one hand, and of the little effect that general medication has on most diseases of the ear on the other hand, but little encouragement could be expected from this latter course. None of these authors give the history of their cases for any length of time after treatment, and the ultimate result is unknown.

A few cases of operation are, however, reported where the patients have been under observation for a long time, and in whom the good results of the operation have been confirmed by others than the operator. The different methods used have been removal by the gouge and hammer,<sup>1</sup> by the chisel and file,<sup>2</sup> by the dental engine,<sup>3</sup> and by electrolysis.<sup>4</sup>

Although by each of these methods the growth was destroyed and a good result obtained, all except the last two were extremely tedious and vexatious to both surgeon and patient, and removal by the dental engine and by electrolysis seem, with our present knowledge, to offer the best hopes of a rapid and thorough cure.

A very interesting case is reported by Dr. Clarke<sup>5</sup> of the cure of a large exostosis completely closing one meatus by means of electrolysis, the diagnosis and the cure being confirmed by Mr. Hinton.<sup>6</sup> At the first sitting under chloroform two needles attached to the negative pole were inserted at the base of the tumor, and one needle attached to the positive pole at the anterior edge. A current from six pairs of plates of a Stöhrer's battery was allowed to pass for three minutes. No irritation or pain followed. Fourteen days after, under chloroform, two needles with similar attachments were used for five minutes. No ill effect followed this application, and the tumor was somewhat reduced in

may be either congenital or acquired, and also either spongy or solid. I have been unable to consult the references to learn on what ground he makes these assertions, but from such a careful observer should accept them. To the congenital variety must probably be referred those cases in which the two ears are similarly affected, and in which there is no history of previous inflammation.

<sup>1</sup> Archiv für Ohrenheilkunde, xi., page 115.

<sup>2</sup> L'Union médicale, May 30, 1868, and Archiv für Ohrenheilkunde, x., page 110.

<sup>3</sup> Otological Congress, New York, 1876.

<sup>4</sup> British Medical Journal, December 6, 1873.

<sup>5</sup> British Medical Journal, December 6, 1873.

<sup>6</sup> Hinton's Aural Surgery, 1874.

size. Three weeks from this time, on examination, the exostosis was found to be loose and was removed entire. The attached surface where the needles were inserted was seen to be absorbed to a mere point, and this point had broken off.

Another case which was under my own observation, both before and after treatment, was operated upon by Mr. Dalby, of London, in the same way, but the result was less fortunate. A polypoid growth behind the exostosis with symptoms of cerebral irritation rendered the operation necessary. The various details of the operation I do not know, but the patient said that he suffered extremely from acute inflammation of the ear for some days after the operation. As the result either of the electric current or of the tympanic inflammation the facial nerve on the affected side was paralyzed. When I saw him, some four months after the operation, the exostoses had entirely disappeared, the meatus was normal, the old purulent tympanic inflammation had subsided, and the result was a most perfect one except for the unfortunate accident of the facial paralysis which remained without improvement. Mr. Dalby<sup>1</sup> considers that the tympanic inflammation extended to the Fallopian canal, and thus caused the paralysis of the portio dura; for if it had been due to the electric current it would have occurred immediately, whereas it did not show itself till the next morning. Since this Mr. Dalby<sup>2</sup> prefers the operation of grinding the bone away, and for this purpose uses the drills in common use among dentists.

Mathewson<sup>3</sup> was highly successful in the removal of a large exostosis by means of the so-called dental engine. The instrument used was an Elliott's suspension dental engine with drills of three sizes. The patient was etherized, the integument covering the exostosis removed by a dental scaler, and the growth perforated at several points with the smallest drill, one and a half millimetres in diameter. These perforations were then enlarged and united by the larger drills, two and a half and three millimetres in diameter, and the irregularities ground away. The operation lasted some twenty or thirty minutes. The pain afterwards was easily relieved by warm-water douching and small doses of opiates. Purulent discharge with swelling and granulations at the seat of operation continued for some weeks, but finally ceased entirely, leaving a meatus of full size through which the membrana tympani was seen. The hearing was restored nearly to the normal standard.

The advantages of the dental engine over the other methods of operating, Mathewson says, are that it is less tedious from the rapidity of its revolutions, and less dangerous in that the rapidity of its motion perforates with slight pressure and the risk of slipping and injuring important parts of the ear is very much diminished.

<sup>1</sup> The Lancet, January 22, 1876.

<sup>2</sup> Op. cit.

<sup>3</sup> Report of the International Otological Society, 1876.

## RUPTURE OF AN ABDOMINAL CYST BY PALPATION.

BY J. R. CHADWICK, M. D.

ON October 8, 1877, Mrs. J. F., who had had two children and four abortions, the latter induced by operative procedures, applied at my dispensary for treatment. The last abortion, six years ago, had been followed by severe inflammation, owing in part to retention of the placenta. Since that time her health had been poor, but there was no history of any recurrence of the acute inflammation. For six weeks there had been slight, constant metrorrhagia, an ache in the back and hips, constipation, and hæmorrhoids. Micturition had been normal, and there had been no leucorrhœa.

Examination showed the uterus to be held immovably in extreme anteversion by a general induration of the perimetric tissues, and by a body resting upon the organ and rising into the abdomen. This mass was of irregular outline, was merged below in the general induration, and was of varying consistence above, feeling in some places like a thin-walled cyst; it formed a distinct rounded prominence in the right ovarian region. Obliquely behind and to the right of the cervix was a hard, immovable, rounded, tender body, presumably the right ovary. The prominence in the right ovarian region imparted the sensation of a cyst, with a wall so thin that I warned my assistant, Dr. W. O. Hunt, of Newtonville, against the danger of rupturing it by manipulation. The whole condition was attributed to inflammatory action, chiefly cellutic, the cyst being considered either dropsy of the right Fallopian tube or an encysted peritoneal effusion. Enemata of hot water, hot hip baths, and iodide of potassium were ordered.

On October 12th the patient reported herself more comfortable, but full dejections had not been secured by the enemata.

While very cautiously making the combined abdomino-pelvic examination, with my mind alive to the dangers of rupturing the cyst, — although I had never known that mishap to have occurred, — the prominence on the right side of the abdomen, and a great part of the mass overlying the body of the uterus, suddenly subsided under my hand. I gazed at the patient's face with a momentary apprehension lest she should fall into a collapse on the table, as would have been likely to occur had the contents of the cyst been purulent, or possibly if they had been of ovarian origin. Her calm, unconcerned expression, however, reassured me. The whole posterior wall of the uterus could then be distinctly felt. There was no escape of fluid from the vagina.

I went to the patient's house the next afternoon in response to a summons, fully expecting to find symptoms of impending peritonitis. There had, however, been only a little gastric disturbance and painful movement of wind in the intestines.

On November 28th examination showed that there had been no reaccumulation of the fluid in the cyst; the induration in the pelvis was rapidly disappearing, and the uterus regaining its natural mobility. Menstruation had lasted eight days, rather profusely. Since that date the patient has been free from all uncomfortable symptoms.

The fact of the discharge of the fluid in this case by rupture of the cyst without the supervention of peritonitis tends to confirm the diagnosis of encysted peritoneal effusion or dropsy of the Fallopian tube, with a preponderance of probability in favor of the former.

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## RECENT PROGRESS IN ORTHOPÆDIC SURGERY.

BY E. H. BRADFORD, M. D.

*Anchylosis of the Hip-Joint; Section of Femur.* — Mr. Adams claims for his operation (section of the neck of the femur with a subcutaneous saw) that "in a very large proportion of the cases operated on the subcutaneous division of the neck of the thigh-bone proved to be as harmless an operation as subcutaneous tenotomy." He insists upon the importance of operating on suitable cases only. In the fatal instances he thinks the operation was ill judged.

Mr. Adams has collected twenty-two cases of his operation.<sup>1</sup> Of these two died, one of pyæmia and one of secondary disease. When successful, the operation seems to have been followed by no unfavorable symptoms.

Beside the cases in Mr. Adams's table, the operation has been recently successfully performed by Mr. Golding Bird.<sup>2</sup> The results in the successful cases have been excellent. Mr. Adams's patient was able two years after the operation to walk seven or eight miles. Mr. Adams has never obtained motion after section of the neck of the femur; this has, however, been gained by Jessop, Sands, and Lund. Two cases of Mr. Lund were examined eighteen and nine months after the operations (sections of both femora in each case). Good motion was found at one joint in each case; both patients were able to walk about freely with the help of a cane.<sup>3</sup>

Section of the femur below the neck has been reported within the last year by Golding Bird,<sup>4</sup> Hamilton,<sup>5</sup> Maunder,<sup>6</sup> Croft and Brodhurst three cases.<sup>7</sup> In all these cases the operation was successful, and attended by little constitutional disturbance. The chisel was used as

<sup>1</sup> Med. Chir. Transactions, second series, vol. xlii.

<sup>2</sup> Guy's Hospital Reports, third series, vol. xxii., 1877.

<sup>3</sup> British Medical Journal, September 29, 1877.

<sup>4</sup> Guy's Hospital Reports, third series, vol. xxii., 1877.

<sup>5</sup> Ohio Medical Recorder, August, 1877.

<sup>6</sup> British Medical Journal, December 8, 1877.

<sup>7</sup> Transactions of the London Clinical Society, vol. x.



recommended by Maunder in all instances except those of Messrs. Croft and Brodhurst. Mr. Bryant<sup>1</sup> mentions a case which terminated fatally a few months after operation.

Section (with a chisel) of the femur just below the trochanter has been performed recently by Dr. Porter<sup>2</sup> at the Massachusetts General Hospital. The patient was nineteen years old, and had been bed-ridden for four years. There was deformity at the left hip-joint, and no motion at either hip-joints or at the right knee-joint. There was also necrosis of the right tibia. The patient's condition improved for a time after section of the femur, but death took place four months after the operation. An abscess formed in the left thigh, apparently secondary to the operation, although strict antiseptic precautions had been used.

In the eight cases, therefore, of section of the femur below the trochanter, performed in the last year, two have died within six months after the operation.

In the New York *Medical Record*<sup>3</sup> the ultimate result of Dr. Sayre's case of section of the femur is mentioned as being very unsatisfactory, the patient being in a worse condition than before the operation.

Dr. C. F. Taylor<sup>4</sup> reports two cases of fracture of the thigh near the trochanter in ankylosed hip-joints. In one the fracture was made by a specially devised osteoclast; in the other, as in a case under the care of M. Tillaux,<sup>5</sup> the fracture was accidental during an attempt at *brissement forcé*. In all these cases the result was a useful limb in improved position.

*Curved Tibiæ; Section of Bone.*—This operation, introduced by Jobert, and so enthusiastically adopted by Boeckel, who has performed it thirty-four times with favorable results in all cases, and also by German surgeons (Billroth, Volkmann, and Schede), appears to be gaining favor with English surgeons.

Bradlee<sup>6</sup> reports having performed the operation four times on two patients. Mr. Bradlee's cases were six and three years old. Firm union took place in from three to six weeks. T. Jones<sup>7</sup> has operated in this way on four patients, cutting both tibiæ in each. Cowell<sup>8</sup> reports a case in a child four years old. Walking was impossible, owing to extreme deformity of the tibiæ. One tibia was divided with the saw, and two months later the second with the chisel. Five weeks after the second operation the patient left the hospital, able to walk quite well.

<sup>1</sup> Lancet, December 22, 1877.

<sup>2</sup> The notes of this unpublished case have been furnished by the kindness of Dr. Porter.

<sup>3</sup> March 2, 1878.

<sup>4</sup> New York Medical Record, April 21, 1877.

<sup>5</sup> L'Union médicale, Nos. 27 and 29, 1876.

<sup>6</sup> Lancet, July 21, 1877, page 78.

<sup>7</sup> Lancet, vol. ii., page 235, 1877.

<sup>8</sup> Lancet, vol. i., page 420, 1877.

Barwell<sup>1</sup> has also operated successfully in two cases. Schede<sup>2</sup> mentions three successful cases at the ages of twelve, fifteen, and eighteen. Albert<sup>3</sup> reports three cases in children, in one of which the tibia was divided in two places. Strict antiseptic precautions were used, and recovery took place without suppuration. Heineke<sup>4</sup> reports two successful cases.

The operation has therefore been done recently thirty times on fifteen patients, with good results. If we compare this with Boeckel's results, with Billroth's and Volkmann's eighteen operations for osteotomy in nine patients, all successful, and with the favorable opinion of other surgeons, it will be admitted that the dangers of the operation cannot be great, even allowing that a certain number of unsuccessful cases have not been reported.

Most German surgeons seem to prefer the chisel in operating, but Jones and Bradlee find the saw most convenient; the latter states that the division of the bone is made with the greatest ease through a small puncture through the skin made by a tenotome. Antiseptic precautions should always be used. Naturally the operation should be performed in the extreme cases only where other measures have failed.

*Club Foot.* — Mason<sup>5</sup> excised the astragalus and cut off a portion of the external malleolus in an adult patient with congenital club-feet. The wound did not do well; secondary hæmorrhage followed; amputation of the limb was performed, but the patient died within a few days.

Verbelzi<sup>6</sup> reports a successful case of congenital club-foot in a child five and a half years old, treated by excision of the astragalus. An incision was made parallel to the length of the astragalus, the periosteum was raised, and the bone scratched out. The foot was then brought into position, and a fenestrated plaster-of-Paris bandage applied. Complete recovery is said to have taken place, but the details are not given.

This operation has also been performed successfully by Mr. Lund, on both feet, in a child seven years old.<sup>7</sup>

Davies Colley<sup>8</sup> advocates resection of the tarsal bones in extreme cases of talipes equino-varus, where other measures have failed. In the case reported (a boy twelve years old), ten days after the operation on the second foot and twelve weeks after the first operation, the patient

<sup>1</sup> *Lancet*, December 22, 1877, page 922.

<sup>2</sup> *Berlin. klin. Wochenschrift*, September 3, 1877.

<sup>3</sup> *Wiener med. Presse*, September 16, 1877.

<sup>4</sup> *Deutsche med. Wochenschrift*, November 24, 1877, page 564.

<sup>5</sup> *New York Medical Record*, July 14, 1877.

<sup>6</sup> *Centralblatt für Chir.*, No. 24, 1877.

<sup>7</sup> *British Medical Journal*, October 19, 1872.

<sup>8</sup> *Med. Chirurg. Transactions*, second series, vol. xlii., 1877.

was able to walk about without any apparatus. Two months later, when reëxamined, no apparatus having been worn in the interval, the foot was found in good position, the boy treading on the whole of the sole. The patient could walk, hop, and jump. Six months later he was able to walk eight miles.

Mr. Davy<sup>1</sup> has operated in three cases by removing the cuboid bone (an operation first performed by Mr. Solly) or both cuboid bones, and in three cases by excising a wedge-shaped piece from the tarsal arch in equino-varus, and in one case of simple equinus. Death from septicæmia occurred in one case. In the others recovery from the operation took place, and from the report the cases progressed or were progressing favorably.

Mr. Lund showed before the Medical Society of London<sup>2</sup> a case operated on by him in May, 1877, for double talipes by removing the astragali. The boy was able to walk about with ease. The astragalus was removed after incision through the soft parts by means of a gouge and a short, curved hook with a cutting edge on its concavity.

The operation has also been successfully performed by Mr. Lund,<sup>3</sup> and by Mr. Thos. Smith and Prof. John Wood.<sup>4</sup>

*Knock-Knee.* — In almost all cases of genu valgum the deformity is maintained by a vertical enlargement of the internal condyle, or an atrophy of the external condyle. (Verneuil.<sup>5</sup> Ogston.<sup>6</sup>)

The weight of the trunk presses more on the external condyle of the femur than on the internal. In certain pathological states of the bone the growth on the external side is in this way hindered, and the internal condyle finally becomes lengthened. In almost all cases in children knock-knee can be corrected by persistent mechanical treatment.

At the National Orthopædic Hospital in London the patients are placed in bed to remove the superincumbent weight.<sup>7</sup> Mechanical support to remove the existing deformity is to be applied. Straight splints adapted to the outer side and a bandage to the whole length of the limb answer in the simpler cases.<sup>8</sup> In the most aggravated cases the limb is fastened in two gutter splints, one for the thigh and one for the leg. These are to be united at the knee by a ratchet joint; by means of a key the limb can be made straighter. But little force can be used, however, and but little is required.

It is rarely necessary, according to Vincent, to cut the hamstring

<sup>1</sup> Lancet, March 16, 1878, page 388, and British Medical Journal, December 15, 1877.

<sup>2</sup> Lancet, March 16, 1878, page 389.

<sup>3</sup> British Medical Journal, October 19, 1872.

<sup>4</sup> Lancet, March 16, 1878, page 389.

<sup>5</sup> L'Union médicale, October 24, 1877.

<sup>6</sup> Archiv für klin. Chir., Band xxi., Heft 3, 1877.

<sup>7</sup> Vincent, Medical Press and Circular, June 20, 1877.

<sup>8</sup> Fisher, Lancet, January 20, 1877.

tendon. Sometimes the external ligament is to be divided. The operative treatment in extreme adult cases was thoroughly discussed at the sixth congress of German surgeons.

Langenbeck in four cases cut the external lateral ligament, straightened the limb forcibly, placed it in a plaster-of-Paris bandage, and afterwards applied apparatus. Although in straightening the limb air was sucked into the joint, the result was satisfactory in all cases.<sup>1</sup>

Delore's method of forcibly straightening the limb has been done successfully by Billroth, Volkmann,<sup>2</sup> and Tillaux.<sup>3</sup>

Mayer, Schede, and Heine have operated by chiseling a wedge-shaped piece out of the tibia, and either breaking the fibula or cutting it with the chisel. Schede showed at the congress of surgeons the four cases operated on by him. Union took place readily, and the use of the limb was perfect.<sup>4</sup>

In one of Heine's cases osteomyelitis of the tibia followed, delaying recovery, which, however, is reported to have taken place ultimately.

Annandale<sup>5</sup> opened the joint, sawed off the internal condyle under antiseptic precautions, and placed the limb in position. The result was recovery with a stiff joint.

Ogston<sup>6</sup> has operated twice successfully, making a section of the internal condyle with Mr. Adams's subcutaneous saw. The knee was flexed; the anterior surface of the femur was sawn in the median line nearly to the popliteal surface; the limb was then straightened, causing fracture of the internal condyle. No elevation of temperature followed. Twelve weeks after the operation on one knee, and five weeks after that on the other, the patient was allowed to go about, there being perfect motion at the knee-joints. The second case was also perfectly successful.

Chiene<sup>7</sup> operated successfully by cutting a wedge-shaped piece of bone from the internal condyle and straightening the limb.

*Hip Disease: Conservative and Operative Treatment.*—Mr. Holmes<sup>8</sup> reports the examination of three patients on whom he had performed the operation of excision of the hip-joint successfully, eleven, twelve, and thirteen years previously. There was but little shortening, and the patients were all able to walk without a cane; only one, however, could bear his weight upon the affected limb. Motion was excellent at the new joint. Mr. Holmes believes that the limb, after successful excision, does not give so good a support and is not so useful as that resulting from a "natural cure," as he terms it.

<sup>1</sup> Berl. klin. Wochenschrift, October 1, 1877, page 40.

<sup>2</sup> Berl. klin. Wochenschrift, October 1, 1877.

<sup>3</sup> Bulletin de la Société de Chirurgie, 1876, Nos. 7 and 8.

<sup>4</sup> Centralblatt für die med. Wissenschaften, May 12, 1877.

<sup>5</sup> Edinburgh Medical Journal, July 18, 1875.

<sup>6</sup> Loc. cit.

<sup>7</sup> Edinburgh Medical Journal, September, 1877, page 260.

<sup>8</sup> Medical Times and Gazette, November 3, 1877.

Dr. Gibney<sup>1</sup> gave an analysis of eighty cases of hip disease where recovery took place from what he terms "nature's cure," no particular treatment except constitutional having been followed.

In thirty-three the disease lasted three years; in twenty-eight from three to six years; in one case fifteen years. In forty-eight cases abscesses had existed. Out of the eighty cases motion was reëstablished in twelve in arcs of from 15° to 90°. In seventy-one cases the cure was accomplished before the fifteenth year. In only eight of these cases such deformity resulted as to interfere with walking. In a large majority of cases there was but two inches shortening.

Cazin<sup>2</sup> reports that of eighty cases of suppurative hip disease treated at the hospital at Berck in the course of five years, forty-four were cured, ten died, twenty were not cured, six were improved, — a percentage of recovery of fifty-five per cent. Cazin has seen recovery in desperate cases. In fifteen cases of suppurative coxitis with albuminuria, five died under conservative treatment, two were discharged improved, six not improved, and two cured.

Dr. Yale<sup>3</sup> states that of thirteen cases of excision (twelve operated on by Dr. Sayre) where he was able to follow the cases for a length of time, six died and six were cured, sinuses having discharged and none reappearing. In one, sinuses are still discharging, but the patient's condition is reported to be improved since the operation.

Dr. Poore<sup>4</sup> states that of ten excisions performed by him only one can be considered cured. It would appear from Cazin that in the worst forms of hip disease cure could be hoped for.

According to Dr. Yale, in these cases "the mortality is not increased by the operation; if cured they are cured more speedily."

Mr. Holmes considers that the operation has claims for adoption from "its success in saving life where natural cure seems improbable. These cases are rare if care for years can be provided."

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## PROCEEDINGS OF THE NORFOLK DISTRICT MEDICAL SOCIETY.<sup>5</sup>

HENRY R. STEDMAN, M. D., SECRETARY.

OCTOBER 9, 1877. The society met in Bradlee's Building, Roxbury, at eleven o'clock, the president, DR. JOHN P. MAYNARD, in the chair. Present, twenty-eight members.

*Malignant Pustule.* — DR. ROBERT AMORY reported the following case of malignant pustule.

<sup>1</sup> New York Medical Record, March 2, 1878.

<sup>2</sup> Statistique des Coxalgies suppurés. Bulletin de la Société de Chirurgie, 1876, No. 5.

<sup>3</sup> New York Medical Record, March 2, 1878.

<sup>4</sup> Ibid.

<sup>5</sup> This report has been unavoidably published out of the regular order of the meetings.

On Friday, July 6th, the mother of a boy nine years of age observed a minute spot on the dorsal surface of the foot one inch above the junction of the first and second toes. She reported that in a few hours the small pimple had become filled with a clear fluid, and the skin around its base was red and inflamed. The next morning she sent the boy to see Dr. Amory. Where the pustule had been the day before was a depressed, reddish-looking spot from which exuded a clear, serous fluid; circumscribing this was a uniformly raised bleb, around the outside of which was red, indurated tissue; from the outside circumference the bleb measured about half an inch in diameter. A slightly accelerated pulse at the radial artery indicated febrile action. The temperature was not observed. The appetite appeared to be good, and no untoward symptom had appeared. A simple dressing of glycerine plasma and boracic acid was applied.

On the third day (July 8th) the depression was somewhat enlarged and slightly inflamed; the circumference of the bleb was double the size of the day before, and on being punctured the serum transuded. Indurated and inflamed tissue had extended irregularly over the whole dorsum of the foot, and the latter was somewhat tender on palpation, but there was entire absence of pain and of constitutional symptoms, save an increased rapidity of pulse (110) and absence of stool for forty-eight hours. A mild cathartic (rhamni frangulæ elixir and a small dose of Hunyadi János bitter water) and continued boracic acid dressing was the only treatment.

On the fourth day the sole change in appearance was an extension of the size of the refilled bleb and of the central depressed spot. The skin was quite turgid and tense with the contained serum. There was continued absence of constitutional symptoms. The cathartic had caused two good stools.

On the fifth day, from the central, depressed, reddish-looking spot exuded a drop or two of red sanious serum. The spot itself looking gangrenous, indurated tissue had become softer, but still remained red, the flush extending up the leg. There was no fever and no abnormal symptom. The cloth, being removed, was found to be stained green.

On the sixth day the bleb was punctured, and the serum (clear) allowed to escape on a cloth, which was removed and consumed by fire. The central depressed spot had become desiccated, and appeared demarcated.

On the seventh day, signs of sloughing off of the black eschar.

On the eighth day the eschar was removed and examined under the microscope by Drs. Amory and Fitz. After its removal the spot under it presented a phagedenic appearance, but there was no pus. The cutaneous tissue was entirely gone, and the tendons to the toe could be easily seen through the moist subcellular tissue.

On the tenth day the puffiness and redness had entirely disappeared, and the spot from which the eschar had been removed was occupied by a dark-looking, firmly adherent, dry scab.

The only treatment pursued was rest, fresh air, care to conceal all anxiety as to the result from the child and its parents, and a daily application of the antiseptic dressing, bound tight to the foot, on clean cloths, every cloth removed being immediately burnt. No small vesicles appeared on any other part of the body.

Sixteenth day. Except when the boy has borne his weight upon the affected foot there has been no pain in the ulcer, and no constitutional symptoms have been present. The cuticle and underlying skin corresponding in extent with the watery bleb has entirely disappeared, and in its place is a blackish-red, healthy-looking scab two inches in diameter, with detached margin surfaces. The depression of the surface is quite marked. The sore has been dressed since last report by a daily poultice of soft-boiled carrots. To-day the old dressing was resumed.

Seventeenth day. The scab has assumed a black, gangrenous appearance, with detached margin, and the rest of the ulcer is covered with pus. Flaxseed poultices recommended to clean the sore.

Twenty-third day. The black, gangrenous scab is reduced to a small central portion of about one third the diameter of the sore. The latter has not extended, and granulations have sprung up in different parts of the uncovered ulcer. The old dressing of glycerine plasma and boracic acid is resumed, but as it causes severe burning pain is replaced with water dressings.

Twenty-fifth day. The scab is sloughing off, being attached about three fourths of an inch below the surface.

Dr. Amory regretted that he had not examined the serum for vibriones.

Dr. A. H. NICHOLS inquired what Dr. Amory's theory might be as to the mode of infection in this case. He spoke also of the three varieties of the lesion. First, where the "button" only was visible. Second, in which a large, sloughing, phagedenic pustule, with surrounding inflammation and constitutional disturbance, appeared. Third, where there was no external sign to indicate the disease, but there was marked affection of the spleen. A number of cases which he had investigated were all from the same hair factory, and those affected were all employed in assorting a particularly dirty invoice of hair. He regretted the absence of Dr. Stone, of Walpole, who had seen a large number of these cases, of which an elaborate report had been made.

Dr. FOGG had seen over twenty cases of malignant pustule, many in the above-mentioned factory. In some cases the lungs had been affected, there being much expectoration of pus, cough, etc., but final recovery. There had been two fatal cases in Hyde Park in one year. In one of these, a red, well-marked pustule, black in the centre, appeared on the second day. He prescribed hyposulphite of soda, twenty grains, every two hours. No constitutional symptoms appeared for two days, at which time delirium set in, and face, neck, and chest became swollen and œdematous. The patient had continued his work throughout the disease, and had neglected taking the medicine as ordered. Dr. Fogg said that these had been the only cases in which the treatment by hyposulphite of soda had been followed by a fatal result. In every instance the hair upon which the patients had been at work had come from Siberia. In reply to questions by Dr. Sabine, he described some of the lesions occurring in the digestive tract, and said that in those cases which presented no external pustule the disease was characterized by symptoms of intense erysipelas.

Dr. HENRY A. MARTIN remarked that this was apparently a case in which the disease had been aborted by the antiseptic treatment employed. In other



cases there were present enormous induration of the parts, with severe constitutional disturbance, in which deep incisions had been his treatment. It would be interesting to know if modern antiseptic treatment of these cases had been generally successful. In this case he thought there was no doubt of it, as no pus had appeared until after the poultice had been applied. He also said that cutting out the pustule had been tried, but with doubtful success. Also that the farther removed the sore was from the centre of the body the more successful was the treatment.

DR. AMORY said in reply that the source of infection in this case was probably a foul stream in which the child had been wading, and which received the sewage from various sources, as well as the scourings from a tannery. He remarked also that Ziemssen gave a good account of the pathology of internal malignant pustule. He had had no opportunity to try the hyposulphite of soda treatment, which was supposed to destroy the vibriones circulating in the blood. He used glycerine plasma as an excipient for the boracic acid, owing to its better applicability to the sore.

DR. O. S. ROGERS then read a paper on the Abuse of Medical Charity, since published separately, by request of the society, in the *JOURNAL*, November 1, 1877.

DR. G. D. TOWNSHEND then reported a case of Amputation at the Hip-Joint, lately published in *The American Journal of the Medical Sciences*.

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### ARMY MEDICAL SERVICE.

It may interest some of our readers to learn that an army medical board is now in session in New York for the purpose of filling vacancies in the medical corps, about fifteen in number. The salary of an assistant surgeon is sixteen hundred dollars a year on entering the service, with an increase for every completed five years; also traveling expenses, quarters, fuel, and forage. The following is the general plan of the examination as laid down in a memorandum distributed by the war department:—

(1.) A short essay, either autobiographical or upon some professional subject, — to be indicated by the board.

(2.) Physical examination. This will be rigid, and each candidate will in addition be required to certify "that he labors under no mental or physical infirmity, nor disability of any kind, which can in any way interfere with the most efficient discharge of his duties in any climate."

(3.) Oral examination on subjects of preliminary education, general literature, and general science. The candidate must satisfy the board in this examination that he possesses a thorough knowledge of the branches taught in the common schools, and a failure to show this will end his examination.

Oral examination on scientific subjects will include chemistry and natural philosophy, and that on literary subjects will include English literature, history of the United States, and general history, — ancient and modern. Candidates possessing a knowledge of the higher mathematics, the ancient and modern languages, will be examined therein, and due credit given for a proficiency in any or all of these subjects.

(4.) Written examination on anatomy, physiology, surgery, practice of medicine and general pathology, obstetrics, and diseases of women and children. Oral examination on these subjects, and also on medical jurisprudence, materia medica, therapeutics, pharmacy, toxicology, and hygiene. Few candidates pay the attention to hygiene which it deserves; it is made an important subject in this examination.

(5.) Clinical examination, medical and surgical, at a hospital.

(6.) Performance of surgical operations on the cadaver.

The address of the board is 1193 Broadway, New York, where applicants can obtain any information desired.

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### DIPHTHERIA AT NEWPORT.

THERE have been a number of cases of diphtheria in Newport during the winter, and several families having suffered severely from the fatal effects of the disease, considerable feeling has been manifested by the citizens that no proper steps have been taken by the authorities to improve the sanitary condition of the city. In a letter to the *Newport News* Dr. H. R. Storer urges the importance of establishing a board of health, and points out that there is no organization of that character in the whole State of Rhode Island. A petition has since been made to the city for the formation of such a body. We notice a letter from Dr. Whitney, of Pawtucket, to the same paper in which, if we understand him rightly, he takes the ground that diphtheria is neither contagious nor dependent to any extent upon sanitary surroundings, and we also notice in the list of deaths a statement that "relatives and friends are invited to attend" the funeral of one of the victims at the residence of a family in which several members have succumbed to the disease. As is well known both our own state and city boards of health have taken decided ground as to the contagiousness of this disease, and we think it highly important that, in view of the extent to which this epidemic has raged in New England for several years, the public should be clearly impressed with the importance of preserving the sanitary condition not only of towns and villages, but of private dwellings, and that the present lax notions of conducting the funerals of persons dead of diphtheria or of scarlet fever are calculated to secure a persistence of epidemics of these diseases. We have observed one or two glaring instances of want of caution on these points recently, and although it is manifestly improper to alarm the public by enjoining unnecessary precautions, we think it would be advisable for our health authorities to exercise some control over the funerals of persons dying of diseases considered by them contagious.

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### MEDICAL NOTES.

— The American Medical Association meets, as many of our readers know, this spring in Buffalo. From the journal of that city we copy the following list of papers that are to be presented at the meeting of the surgical section:—

Address by Henry H. Smith, M. D., chairman of the section, On Certain Points in the Pathology of the Bones, including Tubercles. On Disease Germs, their Nature, Origin, and Relations in cases of Wounds, by B. A. Watson, M. D., Jersey City. On Septicæmia after Resections, by D. H. Weeks, M. D., Portland, Me. On Tracheotomy without Tubes, by Henry A. Martin, M. D., Boston, Mass. On Identity of Hospital Gangrene with Diphtheria, by John T. Carpenter, M. D., Pottsville, Penn. On Permeability of Entire Alimentary Canal by Enemata with some Surgical Applications, by

Robert Battey, M. D., Rome, Georgia. On Irritation of the Metatarsal-Phalangeal Articulation in Valgus of the Great Toe, by Frank H. Hamilton, M. D., New York. On the Process of Repair in Wounds with and without Antiseptic Treatment, by Frederick Hyde, M. D., Cortland, N. Y. On Extirpation of the Thyroid Gland, by Julius F. Miner, M. D., Buffalo, N. Y. On Fractures at the Wrist, by John H. Packard, M. D., Philadelphia, Pa. On Pathology and Treatment of Cancer, by Theodore A. McGraw, M. D., Detroit, Mich. On Perityphlitic Abscess, by D. M. Clay, M. D., of Shreveport, La.

All papers to be presented in the session of the section should be forwarded to Henry H. Smith, M. D., chairman of the Surgical Section, No. 1800 Spruce Street, Philadelphia.

— The Mutual Life Insurance Company of New York have recently published the second in their very interesting series of volumes on the vital statistics of life insurance, drawn from an experience of thirty years, and embracing five thousand two hundred and twenty-four deaths. The investigations relative to pulmonary consumption and diseases of the nervous system are especially interesting and valuable. The results of careful medical selection are shown in the diminished death-rate, as compared with all the non-insured, especially in the later years of life, the difficulty of detecting consumptive tendencies in early youth being very great; not so much difference is found in the prevalence of consumption in different States as is shown by general mortality statistics; the average weight of consumptives is considerably below that of non-consumptive persons, so that a light weight is regarded as a suspicious circumstance in estimating the value of a life for insurance; the existence of a strong hereditary tendency in consumptives is confirmed as existing in a minority of cases, and a warning is given against placing undue weight upon its presence or absence; hæmoptysis, although often not indicative of serious disease or tendency to disease in the very young, is thought to be the most valuable sign of the consumptive diathesis, and no person is considered a safe risk for life insurance until ten years have passed from its occurrence. The proportionate mortality from consumption, as compared with deaths from all causes, in the experience of the company, is about two thirds of that which obtains among adults in the community at large. From diseases of the nervous system, however, their proportionate rate, at the various ages, is from nearly fifty per cent. to one hundred per cent. greater than among adults throughout New York city; it may be said, approximately, that the mortality from diseases of the nervous system nearly doubles with each decade of life from the age of twenty upwards.

— A Mr. Abel, of Faringdon, England, having refused to allow his child to be vaccinated, has been fined twenty-five times, in all amounting to about thirty pounds. An English paper in commenting upon the matter says: "Vaccination is no longer a moot point, any more than intoxication. We should not only agree to a twenty-sixth fine inflicted on Mr. Abel, or even to a hundred and twenty-sixth, but should not altogether object to see his child vaccinated by compulsion by the police divisional surgeon of the district. Toleration has been extended too far when it countenances the preparation of the soil for an epidemic of small-pox."

## CLIMATE CURE IN NERVOUS DISEASES.

MR. EDITOR, — While climate treatment of disease has been carefully studied with relation to derangements of the respiratory organs, and the four quarters of the world have been ransacked for localities which shall combine the necessary qualifications for a residence for invalids of that class, it is probable that the same wise course of action has been more thoroughly neglected in derangements of the nervous system than in any other. But a change has of late come over the spirit of our dreams, and therapeutics, which a year ago were in the advance, have retrograded, giving place to new ideas. Opiates yielded to bromides, these to preparations of chloral, these to new vegetable remedies, and these in turn will fall to the rear, slowly assuming, under the crucial test of experience, their proper position in the Pharmacopoeia. Each has its value, but only long years of trial can assign it, and then new forms of investigation derange the table of values as new compounds arise from the crucible's vapors at the touch of the chemist's wand. In such great numbers and varieties are these new *ides*, *ates*, and *ics* appearing, claiming each to possess some special merit far beyond the other, that the doctor who works, and who must read as he runs, turns almost with despair back to the old tinctures and extracts which centuries have proven reliable, leaving just where it should be, in the hands of younger men, the task of testing novelties.

In no branch of practice is the temptation to use these new drugs so strong as in nerve diseases, where symptoms rarely distinctly mark lesions, where lengthy treatment often utterly fails of results, and where patients demand novelties, even if they are of no benefit. In consequence, the array of gayly colored fluids, fragrant with spice, and tasting like a well-mixed cocktail, with effects not utterly dissimilar; of granules, homœopathic in size and effect; of galvanic belts and plasters utterly devoid of any electrical action; and of appliances without number to induce sleep or to prolong it, crowd the shelves of fashionable apothecaries, and are retailed to hypochondriacal customers in immense quantities. Again, as a consequence, the array of invalids of this class steadily grows at a far more rapid rate than does our knowledge of their treatment.

One remedy has yet to run the gauntlet of trial and criticism, and that is "climate cure." Where I write, the warm waters of the Caribbean splash upon the lonely island of New Providence, and soft breezes bring in at every window and door the perfume of a hundred blossoming trees and plants. Living is a luxury, and in thinnest of summer dress we lounge upon the spacious verandas of the Royal Victoria Hotel at Nassau, and stretching out at full length give brain and nerve full rest while mere physiological life progresses. Here indeed is rest. Around me are half a dozen invalids with worn-out nerves, — strong, stalwart men, portly, well-nourished dames, yet martyrs to overworked brain or overstrained spinal cord. They have gone through the entire list of drugs with but small relief, for the cause was yet busy and effect continued. New England climate, with its rapid changes acting as so many direct concussions upon the tightly drawn cord, giving no rest to body or mind, had fully sustained its part, and barely in their prime they had settled down to think their cases hopeless. Long persuasion

was needed and much encouragement called for before they could pluck up spirit enough to make one more trial, the climate cure; and when at last we sailed out of New York in the good ship Carondelet, they were as those who said, "*Lasciate ogni speranza.*" As we steamed southward over seas that were as tranquil as peace, and came into latitudes where heavy clothing was a burden and the sun's rays grew warmer, where New England frosts and home cares alike receded into the distance, and where the content that comes from enforcement arose to combine with the rest, a visible change occurred. Eyes that had known no sleep for months, save under the influence of drugs, grew languid and sleepy, and closed, and the first step in climate cure was reached, — natural, continued sleep. For the next week little else was done except eating, and the anxious look in eyes, the wrinkles in brows too youthful in nature's course for such marks, the trembling hand, the aching backs and heads, were left behind us with the cold winds and waters of northern latitudes. What time they were not sleeping or eating they were congratulating themselves that they came. Already they were fully content. In two cases the pulse-rate, which for a month before our starting had been more than a hundred, after the sixth day fell to eighty-four, and thence steadily down to normal. Then came the return of a healthy appetite. Even sea food, at no time especially attractive to a landsman, was as eagerly looked for as would be at home the *cuisine* of Delmonico or Parker. With a healthy appetite came good digestion and good nutrition. That most uncomfortable derangement which, for want of a better name, we call nervous dyspepsia vanished before the climate cure, and stomachs which would scarcely bear the most delicate farinaceous preparations took excellent care of corned beef and cabbage. This of itself was happiness. When, to the ladies, in addition to sweet sleep, good appetites and digestion, came relief from backache and uterine pain, their cup was full. Every nerve was relaxed, and lost tension was gained health.

I have observed for many years that dysmenorrhœa almost invariably disappears at sea, and one of my patients who had been a life-long sufferer from that scourge of our women told me that she should not have known when the flow occurred, as far as pain symptoms went. By the time the Carondelet came to anchor off the light at Nassau, the cure was well under way; when we drove up to the portico of the Royal Victoria, and walked into a hotel as thoroughly complete in appointment as the Tremont or Fifth Avenue, contentment knew no bounds. Here no mail or telegraph annoys, no rise or fall in stocks can worry, or any failure of insurance companies trouble. There is nothing to do but to rest, breathe the delicious air, eat, sleep, and be merry. Should any be aquatically inclined, there is no spot in the world where there are such lovely sails as about Nassau. The coral reefs and sea gardens offer innumerable attractions to the naturalist, and it is indeed a delight to sail where the skies are ever serene and the winds are always fair. The climate is singularly equable. Three successive winters give me a range of variation of but three degrees in three weeks. From seventy-four at midday to seventy at midnight was the change, except once where it gained one degree and fell to sixty-nine. It is this exceptional steadiness of the thermometer which gives to the lovely island its chief value in nerve diseases, as there is nothing in the world so sure to *agacer* a nervous man as bad weather. When one *cannot* growl thereat one

great temptation to be irritable is gone, and with no mails or telegrams another. The only excitement is upon the discovery of a new orchid or flower, or upon the advent of church and Sunday, — innocuous in the extreme. For the climate cure it would be hard to find a winter sanitarium equalling Nassau in every respect, and when I add to its many attractions the presence of thoroughly trained physicians who are gentlemen in every sense, the measure is full.

After a certain time spent here, should quietude pall and rest grow painful, from Nassau to Havana by the fine steamers of the Murray and Ferris line is but a day and a half, and we are at once in a different world. Busy life of a description unknown elsewhere, crowded streets, beautiful women, excellent music, and pleasant temperature make a change at once beneficial and delightful. Señor Baera, of the Hotel Pasaje (pronounce the *j* like *h*), gives courteous greeting and courteous treatment to the coming and speed to the parting guest. When the hotel is finished and a few changes made in the way of sewerage and the like, a restless invalid will find a day or two of halt made here beneficial. To the medical man there is much that is interesting. In company with Dr. Burgess I made a visit to the hospital for lepers, called after their patron saint, San Lazaros. It is excellent in arrangement and detail, was built and is supported by a bequest from a wealthy leper. The disease here assumes a tubercular form, being identical with the *spedalskhed* of Norway, the first marked symptom being a rapid absorption of the nasal bones and a consequent sinking in of the alæ, giving a most repulsive appearance to the face. As is the case everywhere, treatment is of no possible avail, and the length of the disease varies from eight to twenty-five years, usually ending in tuberculosis of the lungs. Thence the kind and genial doctor drove me to a private establishment under his care, which, with others of its class here, is supported in the following manner: A certain number of persons, in this case limited to twenty-five hundred, subscribe each three dollars per month towards its maintenance, thereby securing admission in case of sickness, and treatment while there gratis. These are generally strangers, of whom Havana contains a large number, — Spanish officers on duty, merchants, and others. The price of board varies with location, etc., being, however, always reasonable. Although there are sporadic cases of yellow fever in Havana every month in the year, Dr. Burgess assured me that just now there was none.

But, *revenons*. Nothing can be more exhilarating than a ride along the Paseo and through the wide streets in the newer portion of the city, where all the town is on wheels from five to seven P. M., when the heat of the day is gone, — and one is ready for a good rest when that is over. After the first of April I would hesitate to advise Cuba, for the midday heat grows strong, while the nights are still cool, and the change is too great for a stranger. Before that time the climate is more equable, while up to the last of May Nassau is perfect. I am firm in the belief that the time is not far distant when climate cure for nervous invalids, who are, as a rule, able to gratify any wish so far as travel goes, will be much more popular than at present, because better understood, and in conclusion wish to say that I shall be happy to answer any questions thereupon from any medical man.

WILLIAM F. HUTCHINSON, M. D.

PROVIDENCE, R. I.

## COMPARATIVE MORTALITY-RATES.

	Estimated Population, July 1, 1878.	Deaths during week ending April 6, 1878.	Annual Death-Rates per 1000 living.		
			For the Week.	For the Year 1877.	Mean of ten Years, '68-'77.
New York.	1,093,171	509	24.21	24.32	28.71
Philadelphia.	876,118	304	18.04	18.80	21.54
Brooklyn.	549,438	170	16.09	21.51	25.50
Chicago.	460,000	108	12.21	17.83	22.39
Boston.	375,476	146	20.22	20.10	24.34
Providence.	100,000	33	17.16	18.81	19.20
Lowell.	55,798	31	28.89	19.09	22.50
Worcester.	54,937	20	18.94	14.07	22.30
Cambridge.	53,547	26	25.24	18.69	20.83
Fall River.	53,207	26	25.41	21.35	24.96
Lynn.	35,528	17	24.89	20.42	19.67
Springfield.	33,981	6	9.19	16.04	19.77
Salem.	27,140	10	19.16	20.28	21.15

MIDDLESEX NORTH DISTRICT MEDICAL SOCIETY. — The annual meeting of the society will be held in their rooms in Mechanics Building, Dutton Street, Lowell, Mass., Wednesday, April 24th, at two o'clock, P. M. GEORGE C. OSGOOD, M. D., *Secretary*.

DR. W. L. RICHARDSON has been appointed secretary of the State Board of Health, *pro tempore*, to act during the temporary absence of the secretary, Dr. Charles F. Folsom, for about four months.

NOTE. — The name of the publisher of Maudsley's Physiology of Mind, omitted through inadvertence from our notice in the JOURNAL of March 28th, is D. Appleton & Co., 549 Broadway, New York.

BOOKS AND PAMPHLETS RECEIVED. — Hand-Book of Ophthalmology. By Professor C. Schweigger. Translated from the Third German Edition by Porter Farley, M. D., Rochester, New York. Philadelphia: J. B. Lippincott & Co. 1878.

The Advantages and Accidents of Artificial Anæsthesia. By Laurence Turnbull, M. D. Philadelphia: Lindsay and Blakiston. 1878.

Clinical Cases, Medical and Surgical. By the late John O. Stone, A. M., M. D. New York: G. P. Putnam's Sons. 1878.

Cyclopædia of the Practice of Medicine. Ziemssen. Vol. XVII. General Anomalies of Nutrition and Poisons. By Professors Immermann, Boehm, Naunyn, and Von Boeck. Translation. New York: William Wood & Co. 1878. H. D. Brown & Co., 67 Cornhill, Boston, New England agents.

Montreal General Hospital Pathological Report. By William Osler, M. D. Montreal: Dawson Brothers. 1878.

Atlas of Skin Diseases. By Louis A. Duhring, M. D. Part III. Philadelphia: J. B. Lippincott & Co. 1878.

Studies in Pathological Anatomy. By Francis Delafield, M. D. No. 2. The Pleura. New York: William Wood & Co. 1878.

Alimentation in Surgical Accidents and Diseases, and its General Value as contrasted with the Value of Medicine. By Frank H. Hamilton, M. D. (Hospital Gazette.)